drawn into the furnace, whereas from the upper opening a tongue of flame will escape. From this it might be concluded that if an opening *m* were made halfway between the top and the bottom of the wall of this furnace, there would be no tendency for the air to be drawn into the furnace nor for tongues of flame to escape.

In reality the phenomenon which occurs is slightly different. At this opening *m,* the outer air will sometimes be drawn into the furnace and at other times small jets of flame will escape, as the pressure within the furnace varies. That is, the level at which the pressure in the furnace is in equilibrium with the atmospheric pressure shifts vertically, now above and now below the level of the opening *m.*

These simple observations show that the pressure of the hot gases within the laboratory of a metallurgical furnace provided with working openings or doors is, on the average, equal to atmospheric pressure. These pressures may be directly measured by the use of a manometer.[1]

Let it now be considered whether it would be possible for a metallurgical furnace to work in a regular and uniform manner if the pressure of the hot gases within the furnace were less than the atmospheric pressure. If the foregoing occurred, an enormous quantity of cold air would be drawn in through the working doors. When this occurred, the depression due to the chimney draft would be entirely overcome. And, further, by reason of this inrush of cold air, the temperature of the furnace would be lowered to such an extent as to produce a very bad effect upon the working of the furnace. In addition, this would be likely to damage the brickwork of the furnace.

In order to understand the working of those furnaces which operate with a natural current of air it is not necessary to take

into account what is called the " draft of the chimney," the only function of the chimney being to remove the burned gases from the heating chamber, in order to provide space for the new or burning gases. By placing this construction upon the question of chimney

(1) Extensive observations covering the temperatures and the pressures at various points in an open-hearth furnace have been made by E. Juon, at the Donetz-Jurjewka works, Russia. M. Juon's paper appeared in Stahl und Eisen, Oct. 24 and Nov. 7,1912. It was abstracted in *The Iron Age,* Dec. **26.** 1912.